Local Readout Ground Station (LRGS)
Client Interface Guide
Version 3.4

July 29, 2003

Prepared for:

U.S. Geological Survey, Water Resources Division (USGS, WRD)
and
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National Environmental Satellite Data Information Service (NESDIS)

Prepared by

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1. Introduction

The LRGS (Local Readout Ground Station) is a suite of open-source software that was developed by Ilex Engineering under contract to the Federal Government. It is unencumbered technology. You are free to download it in source and executable form.

For more information about LRGS software downloads and support options, go to the Ilex Engineering web site at www.ilexeng.com, or email to info@ilexeng.com.

1.1 The GOES DCS and DOMSAT

The LRGS provides a means to retrieve environment messages from Data Collection Platforms (DCP) that have been transmitted through the GOES DCS (Geostationary Operational Environmental Satellite – Data Collection System). The DCS broadcasts all DCP messages over a domestic communications satellite (DOMSAT). The LRGS provides a low-cost ground system for receiving this data stream.

The data flow for the GOES DCS is depicted in Figure 1-1.

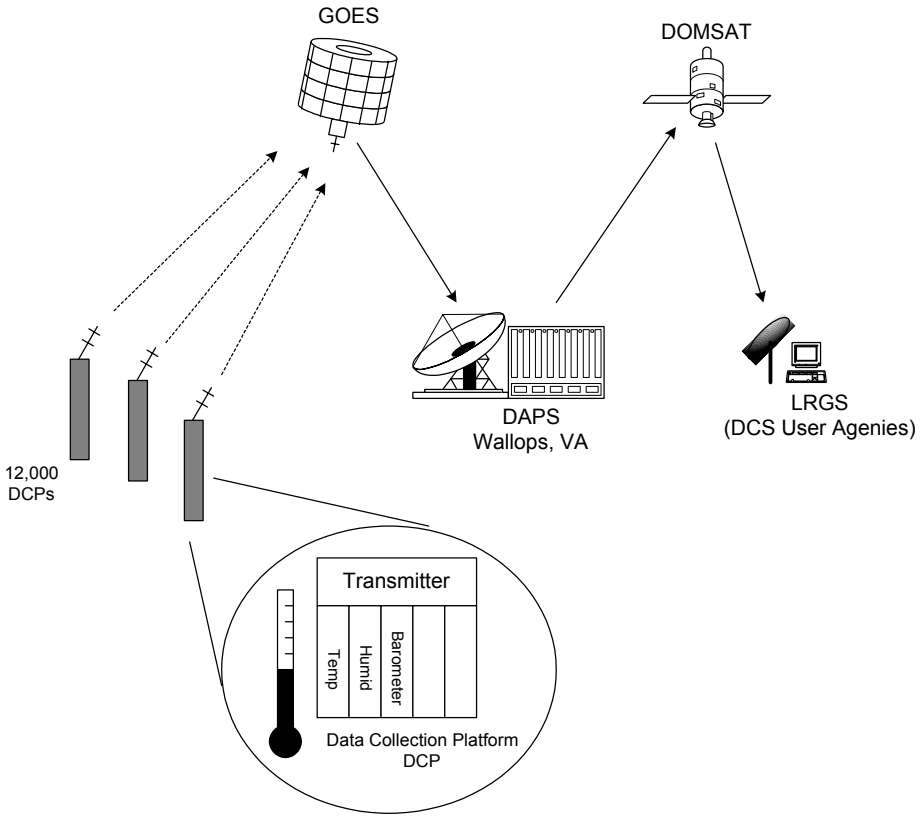

Figure 1-1: The GOES DCS. *The GOES DCS collects data from over 12,000 platforms and redistributes it to DCS User Agencies.*

1.2 The LRGS Client-Server Mechanism

The LRGS software provides a client-server mechanism so that client programs running on other machines can connect to the LRGS and retrieve DCP messages. This might be used by a GUI program to interactively display DCP messages to the user, or it might be used by a background client program to retrieve and process DCP messages for further mathematical analysis.

The client side of this mechanism is the subject of this manual.

This client-server mechanism incorporates a socket-based protocol that is backwardly compatible with the DOMSAT Receive Station (DRS) product that was formerly sold by Integral Systems, Inc. This means that you can use portions of the client software described in this document to retrieve messages from an older DRS system.

Figure 1-2 shows several ways that the client-server interface can be used at a DCS user site. Messages can be viewed on the screen through an interactive browser. Messages can be stored directly in a database. Messages can be decoded and converted to engineering units for further analysis.

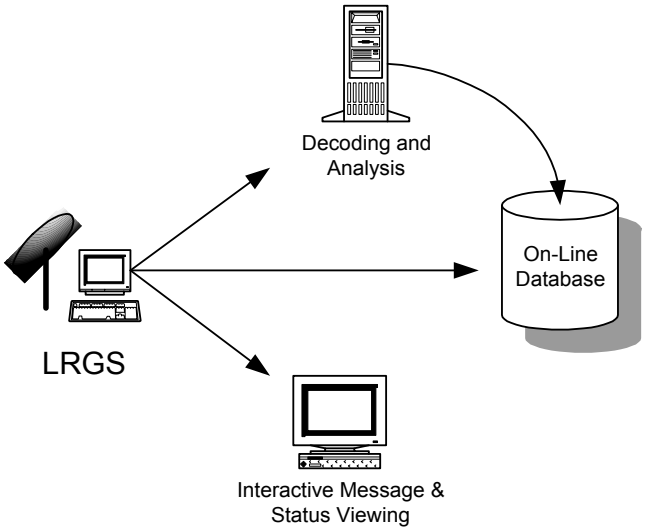

Figure 1-2: Local Processing of DCP Messages. *The client-server a rich set of interfaces for processing DCP messages at the DCS User Site.*

The client-server mechanism provides the following capabilities:

- Select from a list of cooperating LRGS server systems,
- Select DCP messages by any combination of time range, DCP address, network list, or GOES channel number,
- Select and view messages interactively in a GUI browser,
- Retrieve messages and store them locally in a file,
- Toolkit for integrating the message protocol into your network-aware applications. By using this method your applications can receive data in real-time or in periodic batches,
- View real-time status,
- View LRGS events (mainly used for trouble-shooting)

All client software is written in 100% pure Java. As such, it is portable to a wide variety of computer platforms. It will run on any machine with a standards-compliant implementation of the 1.2 Java Virtual Machine (JVM).

1.3 The NESDIS Pilot for Internet Data Distribution

The National Environmental Satellite Data Information Service (NESDIS) operates the DCS. It recently started a pilot program for distributing DCP messages over the internet. The data flow for the pilot is depicted in Figure 1-3. There are two separate LRGS systems at Wallops, VA called "drot.wcda.noaa.gov" and "cdadata.wcda.noaa.gov":

- The DROT machine receives its data through a DOMSAT link, just as any LRGS at a user site would.
- The CDADATA machine receives data through a direct wire connection from DAPS.

The machines are connected via LAN to back each other up, in case one drops data. Both systems are connected to the internet. Either one can be used by your client programs for receiving DCP messages.

The client programs that you download are configured by default to use the NESDIS machine "cdadata.wcda.noaa.gov". NESDIS is monitoring this machine to provide high availability.

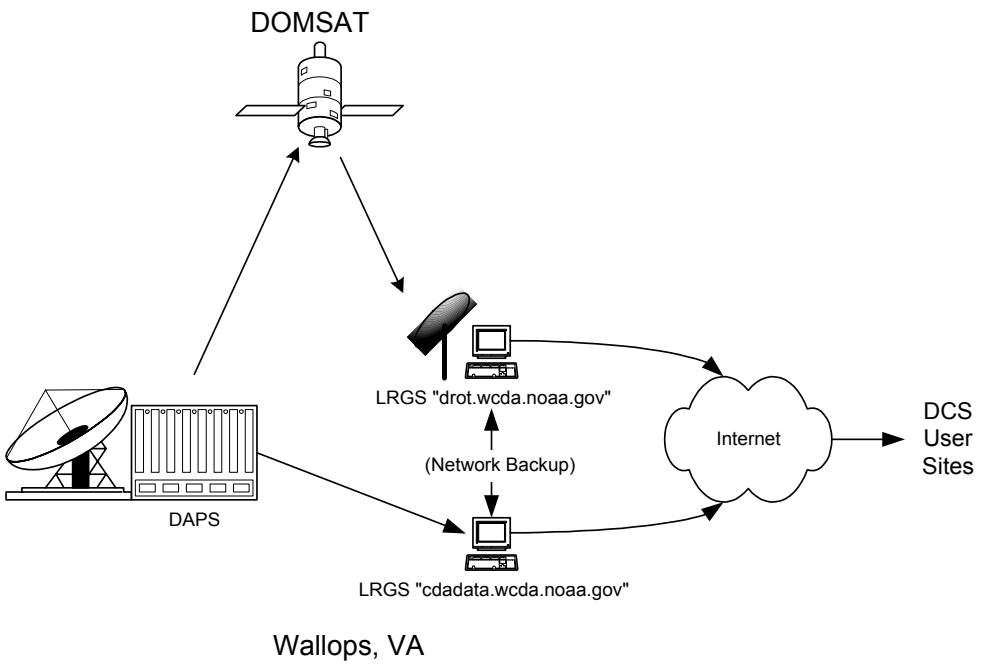

Figure 1-3: The NESDIS Pilot for Internet Data Distribution. *Two machines cooperate to provide high availability and minimal data loss.*

1.4 This Document and other References

The purpose of this document is to provide a guide on using client-side tools to retrieve DCP messages and obtain status information from a LRGS system. The remainder of this document describes the installation, configuration, and usage of the client-side software.

For more information on the LRGS, you can download a complete LRGS Users Guide from http://www.ilexeng.com/LrgsUsersGuide3-4.pdf.

You can find on-line documentation on the GUI programs included in the client download at http://www.ilexeng.com/LRGS-3.4/help/contents.html.

For information on participating in the NESDIS pilot, contact Albert McMath at 757.824.3446.

2. DOMSAT DCP Message Format

Messages retrieved from an LRGS will be formatted with a DOMSAT header. This header is comprised of 37 bytes of ASCII text in the following format:

- 8 hex digit DCP Address – Each platform is assigned a unique address by NESDIS.
- YYDDDHHMMSS – Time the message arrived at the Wallops receive station. The day is represented as a three-digit day of the year (Julian day).
- 1 character failure code (see below for explanation)
- 2 decimal digit signal strength (see below for explanation)
- 2 decimal digit frequency offset (see below for explanation)
- 1 character modulation index (see below for explanation)
- 1 character data quality indicator (see below for explanation)
- 3 decimal digit GOES receive channel – from 001 through 266.
- 1 character GOES spacecraft indicator - ‘E’ or ‘W’
- 2 hex digit uplink carrier status (see below for explanation)
- 5 decimal digit message data length – This indicates the number of message characters that will follow the header.

2.1 DCP Message Types

There are seven basic types of DCP messages transmitted over DOMSAT:

1. **Normal DCP messages**: These comprise the bulk of the DOMSAT data stream. For normal DCP messages, the DCP address is contained in the message header and the failure code will be 'G' or '?'.
2. **Retransmitted DCP messages**: These are DCP messages which were previously transmitted. They are being transmitted again in response to some user's request or in response to the DOMSAT Quality Monitor (DQM) at Wallops.
3. **DAPS-generated status messages**: In many cases, DAPS will generate a separate status message transmitted immediately after the normal DCP message to indicate some type of failure (e.g. a message received on an unexpected channel). The header will contain the DCP address and the message body will explain the error condition.
4. **Global Bulletins**: The DCP address is hex 11111111. These are from the DAPS administrator addressed to all users of the DCS.
5. **DCP Bulletins**: The DCP address is hex 22222222. These are messages from the DAPS administrator addressed to all users of a particular DCP. The platform address is contained in the first 8 bytes of message data.
6. **Electronic Mail**: The DCP address is hex 33333333. These are from the DAPS administrator addressed to a particular DCS user. The first 8 characters of message data contain the DAPS user-ID of the addressee.
7. **'DAPS-ALIVE' Messages**: The DCP address is hex DADADADA. This message is sent out periodically only if there is no other DOMSAT traffic to guarantee that at least one message will be sent per minute over DOMSAT.

2.2 Failure Code

The single character labeled 'Failure Code' in the DCP message header indicates whether the message originated from a DCP or whether it is a DAPS-generated status message. Real DCP messages have a failure code of 'G' for good message, or '?' if the message contained parity errors when received by DAPS.

If the failure code is anything other than '?' or 'G', the message is generated by DAPS. These status messages have the DCP address of the pertinent platform and are typically sent immediately after the real DCP message from that platform. The body of the message will be a brief text message explaining the event.

Possible failure codes are as follows:

Real DCP Messages:

G Good DCP Message

? DCP Message with Parity Error

DAPS Status Messages:

W Previous DCP message was Received on the wrong channel

D Previous DCP message was duplicated (i.e. received on multiple channels)

A Previous DCP message contained a correctable address error

B Previous DCP message contained a bad (unknown) address

T Previous DCP message was received outside its proper time slice (early/late)

U Previous DCP message was unexpected

M The DCP message for the referenced platform was missing (not received in its proper time slice)

I Previous DCP message had an invalid address

N The referenced platform has a non-complete entry in the DAPS Platform Description Table (PDT)

Q Previous DCP message had bad quality measurements

2.3 Signal Strength

Signal Strength will be two ASCII digits and will be in the range of 32 to 57. Signal strength is the implied EIRP, assuming the pilot is a +47 dBm reference.

2.4 Frequency Offset

Frequency Offset will be two ASCII characters. The first will be a plus or minus sign. The second will be on ASCII digit 0 through 9, or the capital letter 'A'. The sign indicates that the DCP is transmitting above or below (plus or minus, respectively) the channel center frequency. The digit indicates the amount of the offset in increments of 50 Hz. The character 'A' represents 500 Hz, which is the worst case frequency error that DAPS can acquire.

2.5 Modulation Index

Modulation Index will be one of the following three characters:

N Normal: (60° ± 5°)

L Low: (≤ 50°)

H High: (≥ 70°)

2.6 Data Quality

Data Quality will be one of the following three characters:

N Normal: Error rate better than 10^{-6}

F Fair: Error rate between 10^{-4} and 10^{-6}

P Poor: Error rate worse than 10^{-4}

3. Installation and Setup

The LRGS Client package is bundled with the DECODES software package. To install the client, you will actually make a rudimentary DECODES installation.

If you require the more extensive decoding and analysis features of DECODES, refer to the DECODES User Guide available at www.ilexeng.com.

There are two types of DECODES installations:

1. A New Installation – if you're installing DECODES to a particular computer for the first time, follow the instructions in sections 3.1 to install Java, then 3.2 to install DECODES.
2. An Upgrade Installation for sites that are running a previous version of DECODES. Consider upgrading to the latest version of Java, as described in section 3.1. Then do the DECODES upgrade as described in section 3.3

3.1 Installing Java

DECODES software is made up of Java archives and scripts for various operating systems. To run the Java code you will need to install Sun Microsystem's Java Runtime Environment version 1.3.1 or higher. To test whether Java is already installed on your machine, open a command-prompt window and type:

```
java -version
```

If you see "command not found" or similar message; or if the version number is before 1.3.1, continue with this section to install Java.

This is available as a free download from:

```
http://java.sun.com/
```

Download the "J2SE" Standard Edition. The latest stable version at the time of this writing is 1.4.1_03. You may download the "JRE", or if you are interested in doing Java development, you can download the "SDK" (Software Development Kit), which contains the JRE plus several development tools.

3.1.1 Installing Java on Windows

Follow these instructions to install the SDK on Windows 2000, NT or XP:

- Download the SDK release, as described above. The current version file name is j2sdk-1_4_1_03-windows-i386.exe. Download the file to your desktop or a temporary directory on your hard disk.
- Double click the icon to start the installation procedure.
- Read and agree to the Sun Microsystems License.
- Choose a destination folder for the Java SDK, or accept the default shown.
- Complete the release via the dialogs.

After installation, open a DOS window and type the command:

```
java -version
```

You should see a version message matching the release that you installed. If you see a message that ‘java’ is not recognized as an internal or external command, then you may need to explicitly modify your PATH variable to include the ‘bin’ directory under the Java distribution. If this is the case, see Figure 3-1 below.

3.1.2 Installing Java under Red Hat Linux

If you want to run DECODES on a machine that is already set up as an LRGS, Java should already be installed. If not, download the JDK for Linux from the Javasoft website, it will be stored in a file named:

```
j2sdk-1_4_0_03-linux-i586-rpm.bin
```

Note -- Release 1.4.0_01 is current at the time of this writing -- the release numbers may be different by the time you read this. Make a note of the release you download and make substitutions to the file and directory names in these instructions.

Login as 'root' and move this file to the /root directory. Then run the shell script to unpack the RPM (RedHat Package Manager) file. Finally, install the RPM.

```
mv j2sdk-1_4_0_03-linux-i586-rpm.bin /root
cd /root
sh j2sdk-1_4_0_03-linux-i586-rpm.bin
(answer the questions about licensing agreement)
rpm j2sdk-1_4_0_03-fcs-linux-i386.rpm
```

This will result in the Java release installed in the following directory.

```
/usr/java/j2sdk1.4.0_03
```

We recommend that you set up a symbolic link pointing to this directory called /usr/java/jdk. You can do this as follows (note, you must be root to do this):

```
cd /usr/java
ln -s j2sdk1.4.0_01 jdk
```

Configure your Login Account for Java

You need to place the bin directory in the Java release into your PATH variable:

```
export PATH=/usr/java/jdk/bin:$PATH
```

Place this command in your .bash_rc file to have it done every time you login.

Verify that the path is properly set by typing:

```
java -version
```

3.2 Installing the Complete DECODES Package

The complete DECODES install is found in a ZIP file with a name of the form:

```
decodes-VERSION.zip
```

For example, the latest release is 5.4, so the ZIP file name is decodes-5.4.zip.

Download the zip file. You can find the latest version of DECODES on the "Download" page at http://www.ilexeng.com.

The complete DECODES Release contains:

- This document in PDF form
- A 'bin' directory containing executable scripts and Java Archive (JAR) files.
- An 'edit-db' directory hierarchy containing the setup information and a set of sample data files.
- An empty 'installed-db' directory
- A directory called 'sample-data' containing sample DCP messages that you can use to interactively decode inside the Database Editor GUI
- A directory called 'to_import' containing EMIT SDF and Network List files from 5 different USGS and USACE districts. These files have been used to test DECODES. You can import this data into your edit database while you are learning DECODES.
- An 'sql-samples' directory containing setup scripts and other files to get you started using DECODES with a relational database (see Chapter 5).
- The Windows-specific release also contains the JRE for Windows.

Create a directory for the DECODES installation. This will be called the "DECODES_INSTALL_DIR" in subsequent manual sections. Extract the Zip file there.

Unix Example: Suppose you chose to install the DECODES software under /usr/local/decodes, then you would enter the following at your shell prompt:

```
cd /usr/local
mkdir decodes
cd decodes
unzip decodes-5.2.zip  .
```

Windows Example: Suppose you chose to install the DECODES software under C:\decodes. After creating this directory run WinZip and extract the contents of the release into this directory.

CAUTION! Some versions of the unzip program, most notably the one included with XP, will try to create an intermediate directory with the same name as the zip file. **YOU DO NOT WANT THIS**. Check that you see the above listed files directory under the install directory.

3.2.1 Setup DECODES Runtime Environment

You need to create on new environment variable on your system:

DECODES_INSTALL_DIR - should be a hard-coded path to the directory where you unzipped the release.

You also need to add the bin directory under DECODES to your PATH variable.

On UNIX systems: Modify your startup script, such as .profile, .bash_profile, etc.

On Windows Systems: From the Start menu, select Settings - Control Panel. Double click on "System". Click on the "Advanced" tab and push the button labeled "Environment Variables…". You see a dialog as shown in Figure 3-1. Note the settings for DECODES_INSTALL_DIR and Path.

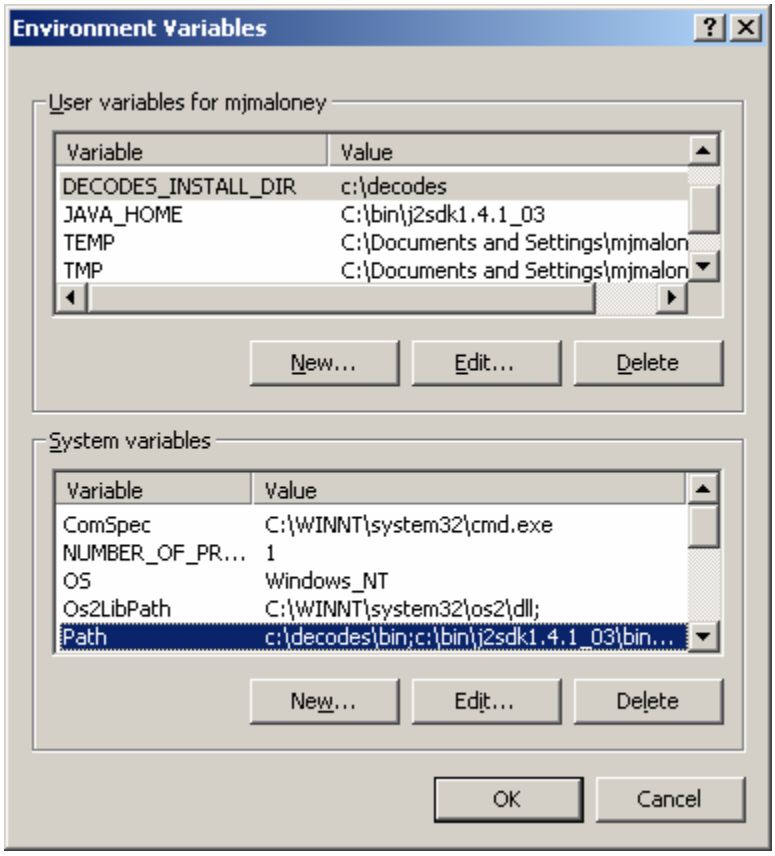

Figure 3-1: Windows 2000 Environment Variable Dialog.

Previous releases of DECODES used a file called "decodes-env" or "decodes-env.bat" that can be found under the DECODES release. If you set the two variables as described above, you no longer need these files.

We have seen inconsistencies in installing Java on Windows systems. Sometimes it is necessary to explicitly add the Java 'bin' directory to the path variable. If this is the case, modify the 'Path' setting under 'System variables. For example, if you installed java at

C:\j2sdk1.4.1_03, then add the following (including the semicolon separator) to the FRONT of the path variable:

```
C:\j2sdk1.4.1_03\bin;
```

3.3 Upgrade Installation

If you are upgrading from an earlier version, download the DECODES upgrade Zip file from the Ilex web site. The upgrade Zip file will have a name like

```
decodes-5.4-upgrade.zip
```

This Zip file contains:

- This document in PDF form
- A 'bin' directory containing executable scripts and updated Java Archive (JAR) files.
- An 'edit-db' directory hierarchy containing the latest version of the setup XML files, as described above (see section 3.1).
- An 'sql-samples' directory containing setup scripts and other files to get you started using DECODES with a relational database (see Chapter 5 below).

To install the upgrade, simple unzip the file over the same location that DECODES was previously installed.

Note that the upgrade does *not* contain the environment file, the properties file or the initial database files. Therefore it is safe to install the upgrade without fear of losing your existing DCP configurations.

3.4 Obtaining a User ID for the NESDIS Pilot

In order to use the client operationally you will need your own User ID. Contact Albert McMath at the Wallops Command and Data Acquisition station (757.824.3446) to obtain an account.

Having your own account is necessary to ensure that the server will maintain your network list and search criteria files. The server uses these files to determine which DCP messages you are interested in.

A test account has been set up with user name "testuser" that you can use immediately. However, if other users are using this account at the same time your files may be overwritten on the server. No password is presently required to use the server.

If you plan to use the client on an on-going basis you are required to call Al McMath to obtain a valid user account. The 'testuser' account is for short-term testing only.

4. The LRGS Client GUI

On windows, double click the file “lrgs.bat” in the directory where the client is installed. This will start the complete client package.

The LRGS client GUI is a hierarchical series of screens. The flow from one screen to another is depicted in Figure 4-1. Each box in the figure represents a screen in the GUI.

You can enter the GUI at any point by starting the appropriate Java class with required command-line arguments. Shell scripts (or “Batch Files” if you’re running Windows) are provided for starting the “Select LRGS”, “Select Services”, and “Message Browser” screens.

You can find reference manual pages for the GUI screens at the Ilex Engineering web site: http://www.ilexeng.com/LRGS-3.3/help/contents.html.

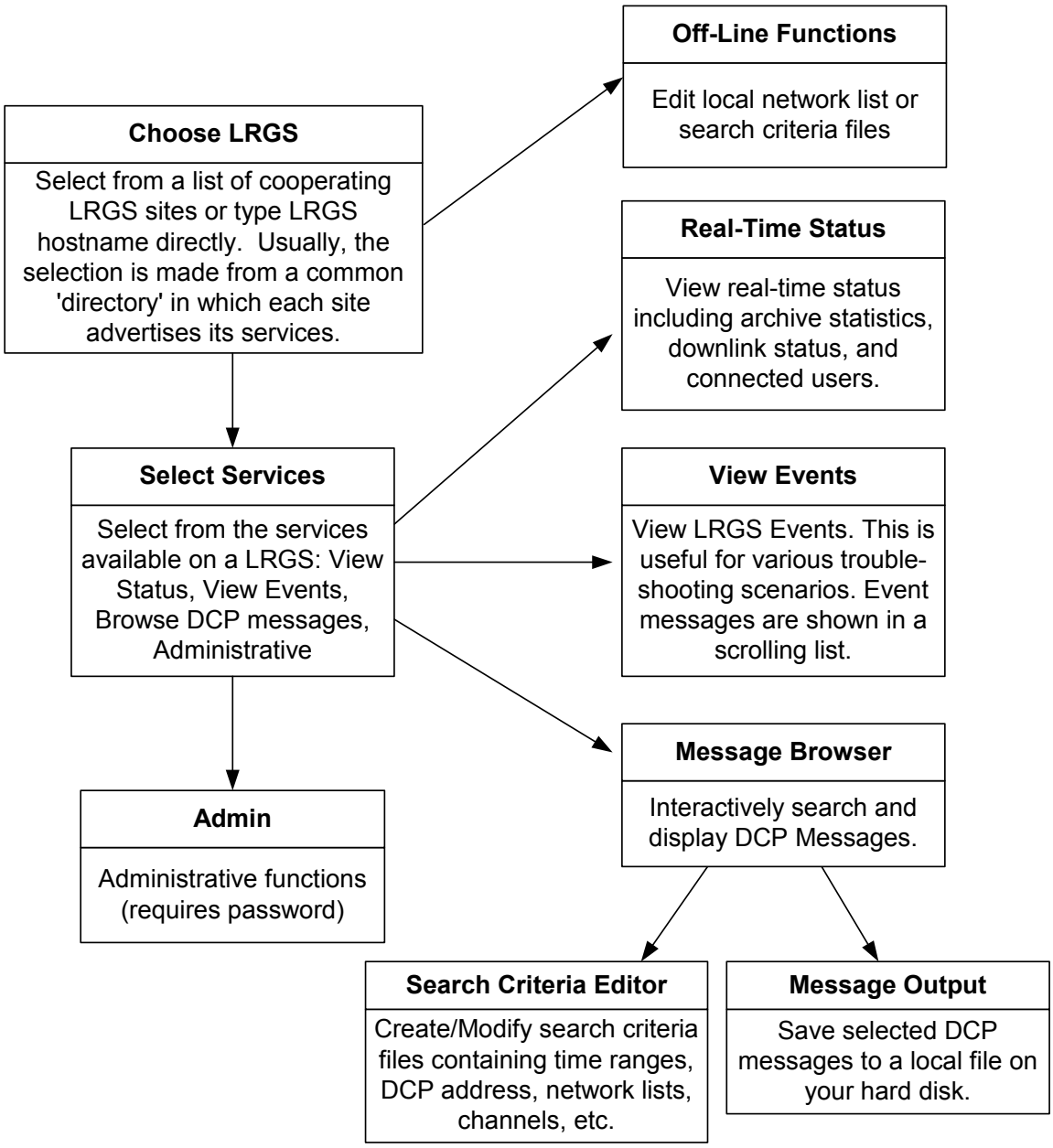

Figure 4-1: LRGS GUI Hierarchy.

4.1 Configure the GUI Start-up Scripts

Start up scripts are included in the LRGS Client package to start up the GUI. By default, the scripts will connect to the LRGS systems whose services are advertised on the Wallops machine cdadata.wcda.noaa.gov. The scripts also contain environment variables specifying the locations of the Java Runtime Environment (JVM) and Object Request Broker (ORB).

The scripts will work fine in most cases as downloaded. Some reasons to modify the scripts might be:

- You are running the Generic LRGS Client on a non-Linux Unix machine and need to change settings for the JVM or ORB.
- You are hosting your own group of cooperating LRGS systems which are not advertised at Wallops.

For UNIX Systems that already have a JRE installed, modify the PATH and JRE_JAR variables defined in "javaenv.sh" appropriately.

4.2 Configure the GUI Properties

The behavior and appearance of many aspects of the LRGS GUI is controlled by setting property values.

The easiest way to change property values is by starting up the GUI and selecting "Properties" from the "File" menu. The Properties menu is shown in Figure 4-2.

Do not be alarmed if you see a message when you start the GUI's saying that the properties-file could not be found. No file will exist until you create one by pressing the "Save" button. The GUI screens select reasonable defaults if the file (or any portion thereof) is missing.

The properties are stored in a file called "lrgsgui.properties" in the LrgsClient directory. You can modify it directly with a text editor if you prefer.

The following table lists all of the properties used by the GUI screens:

Property Name	***Value Type***	***Description***
General.DirectoryIOR	URL	Points to the file containing the interoperable object reference (IOR) to the LRGS directory service.
General.HelpContents	URL	HTML file that is displayed on any screen when user selects 'Contents' from the help menu.
General.HelpAbout	URL	HTML file that is displayed on any screen when user selects 'About' from the help menu.

Property Name	*Value Type*	*Description*
General.Browser	command	The command used to spawn a web browser. This is used for the help system.
General.TextEditor	command	The command used to spawn a text editor. If you leave this property blank the system will attempt to select an editor appropriate to your platform.
LrgsAccess.height	Integer	Preferred height (in pixels) for the LrgsAccess panel running on this machine. Set blank to revert to default.
LrgsAccess.width	Integer	Preferred width (in pixels) for the LrgsAccess panel running on this machine. Set blank to revert to default.
LrgsAccess.x	Integer	Preferred horizontal position (X coordinate) for the LrgsAccess panel running on this machine. Set blank to revert to default.
LrgsAccess.y	Integer	Preferred vertical position (Y coordinate) for the LrgsAccess panel running on this machine. Set blank to revert to default.
LrgsServices.x	Integer	Preferred horizontal position (X coordinate) for the LrgsServices panel running on this machine. Set blank to revert to default.
LrgsServices.y	Integer	Preferred vertical position (Y coordinate) for the LrgsServices panel running on this machine. Set blank to revert to default.
LrgsServices.height	Integer	Preferred height (in pixels) for the LrgsServices panel running on this machine. Set blank to revert to default.
LrgsServices.width	Integer	Preferred width (in pixels) for the LrgsServices panel running on this machine. Set blank to revert to default.
LrgsServices.Help	URL	HTML file that is displayed when user selects ‘This Screen’ from the help menu.

Property Name	*Value Type*	*Description*
LrgsServices.AdminEnabled	true/false	If set to 'false', the "System Administration" button is not displayed on the GUI. The default is 'true'.
RealTimeStatus.x	Integer	Preferred horizontal position (X coordinate) for the RealTimeStatus panel running on this machine. Set blank to revert to default.
RealTimeStatus.y	Integer	Preferred vertical position (Y coordinate) for the RealTimeStatus panel running on this machine. Set blank to revert to default.
RealTimeStatus.height	Integer	Preferred height (in pixels) for the RealTimeStatus panel running on this machine. Set blank to revert to default.
RealTimeStatus.width	Integer	Preferred width (in pixels) for the RealTimeStatus panel running on this machine. Set blank to revert to default.
RealTimeStatus.Help	URL	HTML file that is displayed when user selects 'This Screen' from the help menu.
RealTimeStatus.UpdatePeriod	Integer	Number of seconds between automatic updates to the real-time status display. Set to 0 to disable automatic updates.
LrgsControl.Help	URL	HTML file that is displayed when user selects 'This Screen' from the help menu.
SearchCritEditor.height	Integer	Preferred height (in pixels) for the SearchCritEditor panel running on this machine. Set blank to revert to default.
SearchCritEditor.width	Integer	Preferred width (in pixels) for the SearchCritEditor panel running on this machine. Set blank to revert to default.
SearchCritEditor.x	Integer	Preferred horizontal position (X coordinate) for the SearchCritEditor panel running on this machine. Set blank to revert to default.

Property Name	*Value Type*	*Description*
SearchCritEditor.y	Integer	Preferred vertical position (Y coordinate) for the SearchCritEditor panel running on this machine. Set blank to revert to default.
SearchCritEditor.Help	URL	HTML file that is displayed when user selects 'This Screen' from the help menu.
Events.height	Integer	Preferred height (in pixels) for the Events panel running on this machine. Set blank to revert to default.
Events.width	Integer	Preferred width (in pixels) for the Events panel running on this machine. Set blank to revert to default.
Events.x	Integer	Preferred horizontal position (X coordinate) for the Events panel running on this machine. Set blank to revert to default.
Events.y	Integer	Preferred vertical position (Y coordinate) for the Events panel running on this machine. Set blank to revert to default.
Events.BufferSize	Integer	The number of events that can be displayed before the oldest events are deleted.
Events.UpdatePeriod	Integer	Number of seconds between automatic updates to the events display. Set to 0 to disable automatic updates. (default=5)
Events.Backlog	Integer	The number of historical events to display when connecting to the LRGS. (default=20).
Event.Help	URL	HTML file that is displayed when user selects 'This Screen' from the help menu.
MessageBrowser.x	Integer	Preferred horizontal position (X coordinate) for the MessageBrowser panel running on this machine. Set blank to revert to default.

Property Name	*Value Type*	*Description*
MessageBrowser.y	Integer	Preferred vertical position (Y coordinate) for the MessageBrowser panel running on this machine. Set blank to revert to default.
MessageBrowser.height	Integer	Preferred height (in pixels) for the MessageBrowser panel running on this machine. Set blank to revert to default.
MessageBrowser.width	Integer	Preferred width (in pixels) for the MessageBrowser panel running on this machine. Set blank to revert to default.
MessageBrowser.Help	URL	HTML file that is displayed when user selects 'This Screen' from the help menu.
MessageBrowser.Prefix	String	Initial setting of the Prefix string in the MessageBrowser display.
MessageBrowser.Suffix	String	Initial setting of the Suffix string in the MessageBrowser display.
MessageBrowser.User	String	Initial setting of the user name field in the Message Browser display.
MessageBrowser.Port	Integer	Default port number for Message Browser display.
MessageBrowser.Timeout	Integer	Number of seconds that browser will wait for a DCP message from the server. (default=5)
MessageBrowser.DefaultSearchCrit	String	Name of default search criteria file. Filename field is initially populated with this name.
MessageBrowser.WrapLongLines	true/false	This controls the initial setting of the Wrap Long Lines checkbox.
MessageBrowser.ConnectionsFile	Filename	Name of the properties file that stores successful server connections. The LRGS name (or IP address), port number, and date of last connection are stored.
MessageOutput.height	Integer	Preferred height (in pixels) for the MessageOutput panel running on this machine. Set blank to revert to default.

Property Name	*Value Type*	*Description*
MessageOutput.width	Integer	Preferred width (in pixels) for the MessageOutput panel running on this machine. Set blank to revert to default.
MessageOutput.x	Integer	Preferred horizontal position (X coordinate) for the MessageOutput panel running on this machine. Set blank to revert to default.
MessageOutput.y	Integer	Preferred vertical position (Y coordinate) for the MessageOutput panel running on this machine. Set blank to revert to default.
MessageOutput.OutputFile	String	Name of default output file when "Save to File" is selected in the message browser.
MessageOutput.FileExists	String	Three possible values: 'Fail' means to disallow writing if the specified output file exists. 'Append' means to append to the file if it exists. 'Overwrite' will overwrite the file if it exists.
MessageOutput.Timeout	Integer	Number of seconds that program will wait for a DCP message from the server. (default=5)
MessageOutput.CloseWhenDone	true/false	If set to 'true', the output window will be automatically closed when output has finished (i.e. when the 'until' time is reached).
MessageBrowser.ConnectionsFile	Filename	(Default=LddsConnections) This is the file where the browser remembers the host name and port number of recent sessions.
MessageBrowser.PresentationGroup	name	The name of the DECODES presentation group to use for formatting data.
MessageBrowser.DecodesPropFile	Filename	DECODES properties file, which specifies database types, locations, etc.
MessageBrowser.AfterData	String	Initial setting of the "After Data" field.
MessageBrowser.Decode	true/false	Initial setting of the "Decode Messages" checkbox.

Property Name	*Value Type*	*Description*
MessageBrowser.DefaultSearchCrit	Filename	(Default=MessageBrowser.sc) The search-criteria dialog is initially populated with the contents of this file.
MessageBrowser.UseEditDb	true/false	This flag tells DECODES to use the editable database to decode data.
MessageBrowser.TimeZone	name	(Default=UTC) Time stamps of decoded data are presented in this time zone.
MessageBrowser.OutputFormat	name	The name of the output format for displaying decoded data (default = human-readable).

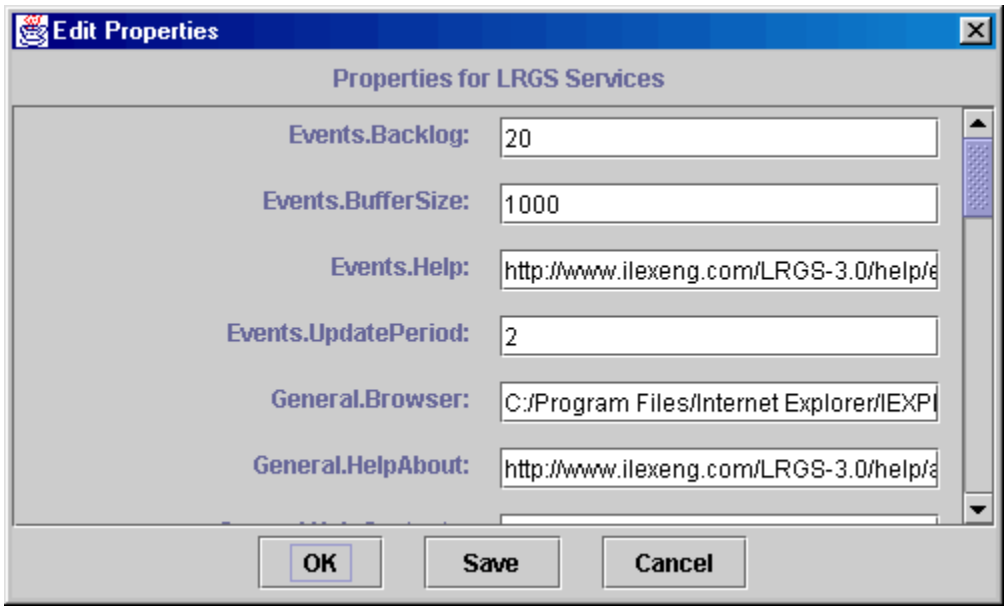

Figure 4-2: Edit Properties Screen. *From this screen you can modify and save the properties that control the appearance and behavior of the GUI.*

4.3 The LRGS Selection Screen

CD to the LrgsClient directory and type:

`lrgsgui` *(on Windows)*

or

`lrgsgui.sh` *(on Unix)*

A screen will appear as shown in Figure 4-3. By pressing the "Select" button you will see a list of LRGS systems that have advertised their services, ash shown in Figure 4-4. After selecting a system, press "Connect". This will connect you to a specific LRGS and take you to the LRGS Service Selection tool.

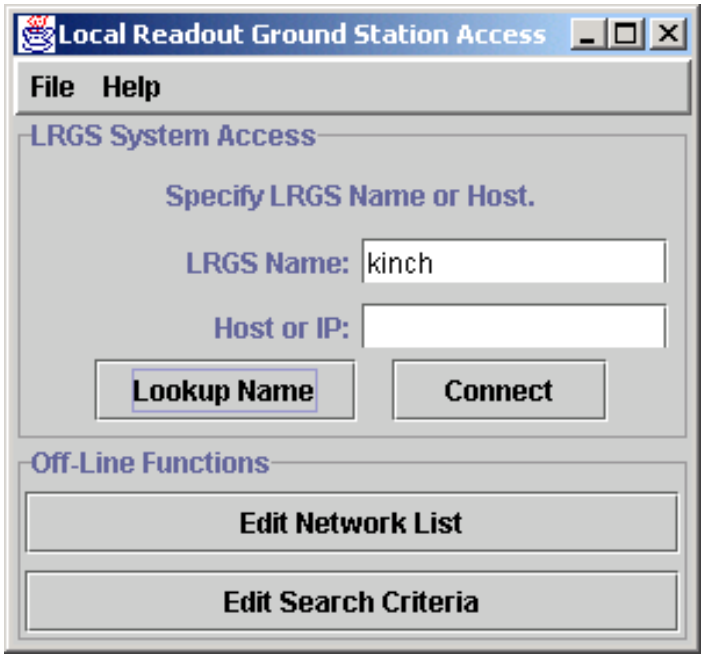

Figure 4-3: Top-Level LRGS GUI Screen.

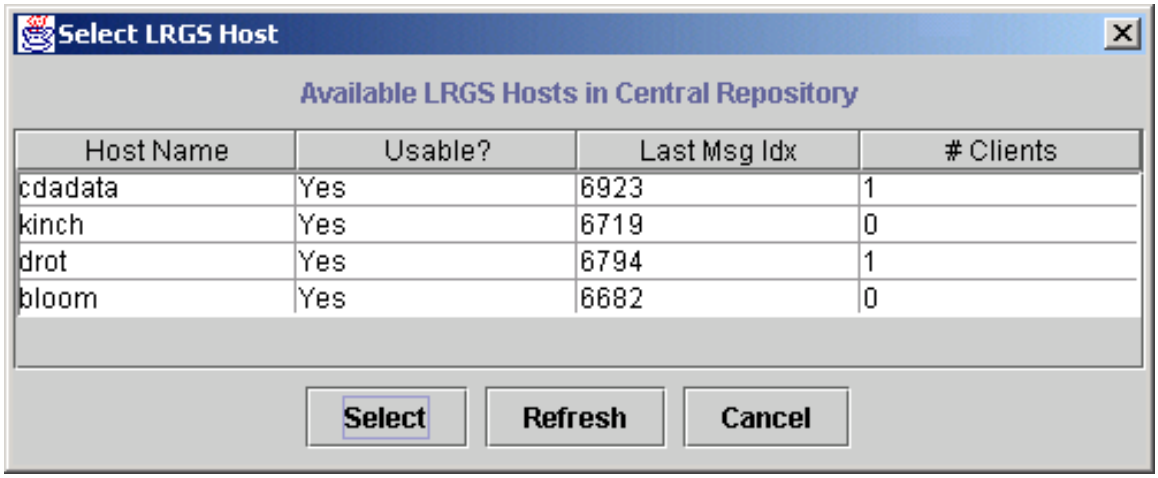

Figure 4-4: Select from available LRGS systems.

4.4 The LRGS Services Screen

You can start the LRGS Services Screen by pressing the "Connect" button from the LRGS Selection Screen.

You can also start it directly by typing:

```
drotgui
```
(on Windows)

or

```
drotgui.sh
```
(on Unix)

Starting the screen this way will connect you directly to the CDADATA machine at Wallops.

The LRGS Services Screen is shown in Figure 4-5. The name of the connected system is shown in the title-bar. The screen shows the overall system status and time. From here you can access other screens by pressing the appropriate button.

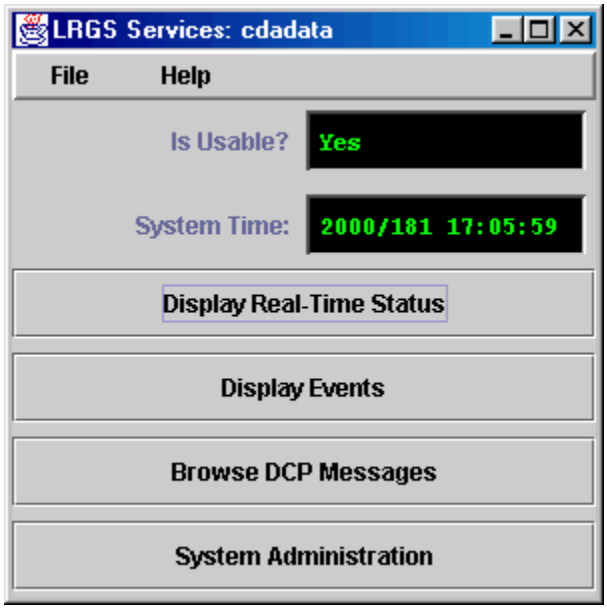

Figure 4-5: LRGS Services Screen.

4.5 Start the Message Browser

You can start the message browser by clicking the "Browse DCP Messages" button from the LRGS Services screen. You can also start it directly by typing:

You can also start it directly by typing:

```
msgaccess
```
(on Windows)

or

```
msgaccess.sh
```
(on Unix)

The Message Browser screen is shown in Figure 4-6.

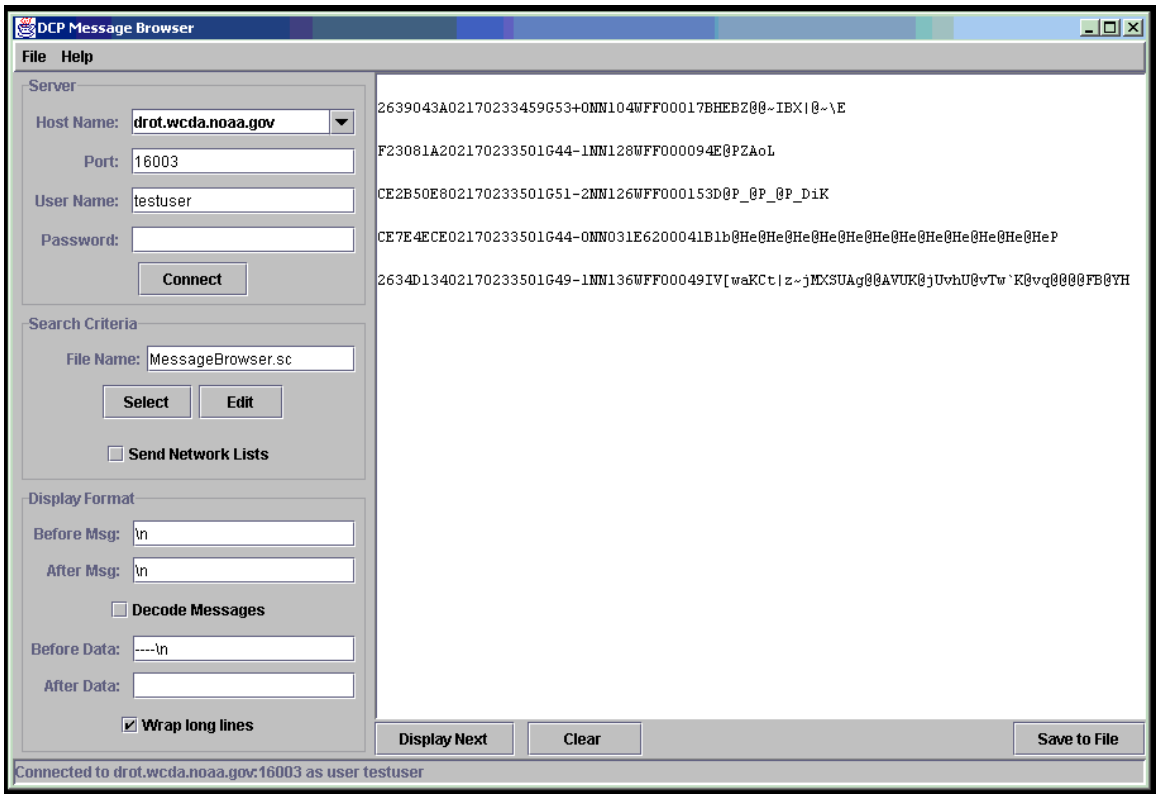

Figure 4-6: Message Browser Screen.

In the upper left quadrant you specify connection information:

- Host Name is either a fully-qualified domain name, an alias, or an IP address specifying the LRGS host you want to connect to.
- Port is a numeric TCP port number. The LRGS DCP data server uses port 17000 by default.
- User Name specifies your ID for connecting to the host. See section 3.4 for a discussion on accounts.

The middle-left section of the screen is where you specify search criteria. You can specify the name of a search criteria file. This file will be downloaded when you first try to display a message.

The "Select" button brings up a file-selection dialog for you to navigate to, and select a file. Once selected, you can press the "Edit" button to bring up the Search Criteria Editor screen, as shown in Figure 4-7.

The check-box labeled "Send Network Lists" allows you to specify how network lists are handled. Recall that a search criteria file can specify network lists to be used. These lists might already reside on the LRGS in your user directory, or in one of the LRGS directories. If this is the case, leave this box un-checked.

Conversely, you may be using a new network list that only resides on your client machine. If this is the case, check the box. The network lists will be downloaded to the LRGS before the search criteria file is transferred.

When the server encounters a network list name in a search criteria file, it looks in directories in the following order:

- If a complete path is specified, only that directory is searched.
- The current DCP Data User's directory (This is typically a sub-directory under ~lrgs/users).
- The current user's UNIX home directory, if one exists.
- ~lrgs/netlist
- ~lrgs/netlist/remote
- ~lrgs

The lower-left area controls the Display Format for each DCP message. The 'Prefix' string is printed before the message. The 'Suffix' string is printed after the message. When the 'Wrap Long Lines' check box is checked, the horizontal scroll-bar will disappear. Long lines will be wrapped. When un-checked, lines of data will not be wrapped. Rather, a horizontal scroll bar will appear allowing you to view the entire message.

4.5.1 Search Criteria Editor

The search criteria editor screen is shown in Figure 4-7. There are several valid formats for entering timer ranges, as explained in section 5.1.1. A commonly used technique is to specify times relative to "now", as shown in the figure.

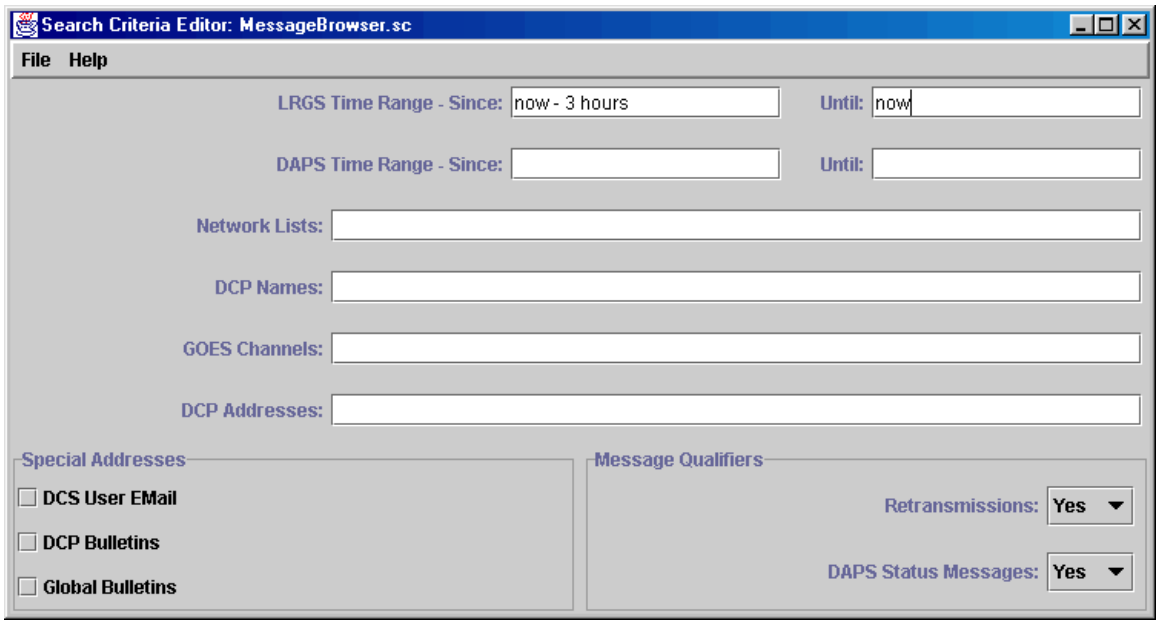

Figure 4-7: Search Criteria Editor.

4.5.2 The Message Output Screen

If you press “Save To File” from the Message Browser screen, The Message Output Screen is displayed, as depicted in Figure 4-8.

In this window you specify an output file to receive the data specified by your search criteria. The radio buttons along the left allow you to specify what to do if the file already exists.

Press 'Run' to start saving data to the file. The DCP address, time-stamp, and message count will be displayed in the screen along the right.

You can pause output by pressing the 'Pause' button. Press 'Run' to continue.

If you want the window to automatically close when the specified 'UNTIL' time is reached, check the box labeled 'Close When Done'.

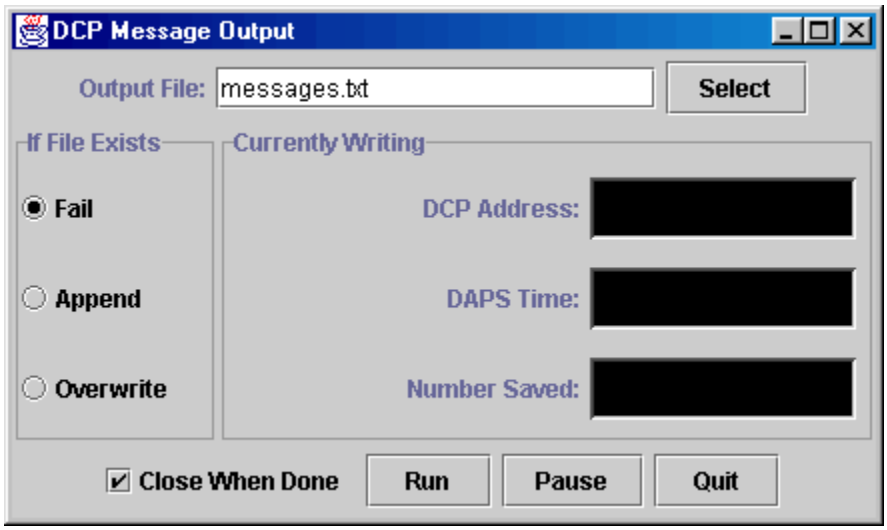

Figure 4-8: The Message Output Screen.

4.6 Adding a button to the Windows Start Menu

In Windows, a common thing to do is to add a button to the Windows Start Menu. This saves you the hassle of opening a DOS windows and starting the screens manually.

Right click over the Windows "Start" button in the lower left corner of your screen. Then select "Open". In the window that pop-up, select File – New – Shortcut.

For command line, specify one of the Batch files described above. Then select an appropriate name and icon, and press "Finish".

4.7 Adding a button to the Linux Task Bar

To add a button to the Linux task bar:

- Right-click anywhere on the task bar and select "Add new launcher".
- Specify an appropriate name and comment.
- For command, put one of the following:

```
cd ~/LrgsClient; lrgsgui.sh
cd ~/LrgsClient; drotgui.sh
cd ~/LrgsClient; msgaccess.sh
```

5. Saving DCP Messages to a File

A command line program called GetDcpMessages is included in the client package. You can use this program to retrieve DCP messages from a server in the background. To run it, type:

```
java lrgs.lddc.GetDcpMessages  arguments...
```

Arguments can be any of the following:

-p *port*	Numeric TCP Port. Default is 17000.
-h *host*	Host can be a name or IP address. Default is "localhost".
-u *user*	(required) Specifies your user name on the server.
-f *searchcrit*	The name of the search criteria file to send to the server. If this argument is omitted, no search criteria file will be sent, this causes the server to send all messages currently in storage, which is probably *not* what you want.
-b *before*	Specifies a string to be output before each message
-a *after*	Specifies a string to be output after each message
-n	Causes a newline to be output after each message
-v	(Verbose) – Cuases various status information to be printed while running.
-d *level*	Sets the debug level: 0 (no debug messages), 1, 2, or 3 (most verbose)
-l *logfile*	Name of log file where debug messages are sent (default=stderr)
-t *seconds*	Timeout value: Number of seconds to wait for a message from the server before exiting.
-s	(single) Use this option to force the client to retrieve messages from the server one-at-a-time. By default, if the server is protocol version 4 or higher, the client will attempt to retrieve DCP messages in 80KB blocks. (This is much more efficient.) Hence, only use this argument in trouble-shooting scenarios.

The *before* and *after* strings can contain control and binary characters by using Unix-style escape sequences.

5.1 Search Criteria File Format

A search criteria file is a text file containing a series of keyword-value pairs, one per line. By convention, search criteria files should have a ".sc" extension. Each keyword signifies a particular criterion that DCP messages must pass in order to be returned.

Each line begins with a keyword, followed by a colon, followed by a string value. Here are the available keywords:

DRS_SINCE	Only retrieve messages that were received after the specified time. *See allowable time formats below.*
DRS_UNTIL	Only retrieve messages that were received before the specified time. *See allowable time formats below.*
DAPS_SINCE	Only retrieve messages with a DAPS time-stamp after the specified time. *See allowable time formats below.*

DAPS_UNTIL	Only retrieve messages with a DAPS time-stamp before the specified time. *See allowable time formats below.*
NETWORK_LIST	The value following this keyword is a network list file. Only retrieve messages whose DCP address is contained in the list. For multiple lists, put multiple lines in the search criteria file, each beginning with the NETWORK_LIST keyword.
DCP_ADDRESS	Only retrieve messages with the specified DCP address. To specify multiple addresses, put multiple lines in the search criteria file, each beginning with the DCP_ADDRESS keyword.
DCP_NAME	Only retrieve messages with the specified DCP name. Names are mapped to DCP addresses in network list files. See the section below on Network List Files for details.
CHANNEL	Only retrieve messages that were transmitted on the specified GOES channel. The value is a number only. The GOES spacecraft identifier (‘E’ or ‘W’) is not necessary.

5.1.1 Allowable Time Formats for a Search Criteria File

The SINCE and UNTIL values can take one several time formats.

Relative formats start with the keyword "now" and then add or subtract increments. For example:

```
now - 20 minutes
now - 1 day
now - 1 week 3 days 20 minutes 10 seconds
now
```

You can specify an absolute GMT value in one of the following formats.

`YYYY/DDD HH:MM:SS`	complete specification
`YYYY/DDD HH:MM`	seconds assumed to be 00
`DDD HH:MM:SS`	assume current year
`DDD HH:MM`	seconds assumed to be 00
`HH:MM:SS`	assume current day
`HH:MM`	seconds assumed to be 00

You can specify that output should start with the last message you retrieved from a previous session. This is a special value that can only appear in the LRGS_SINCE field. Simply type the word:

```
last
```

The "last" keyword provides an easy way to connect periodically and processes all messages that have arrived since your last session. Simply connect periodically and use the time range:

```
LRGS_SINCE: last
LRGS_UNTIL: now
```

The server tracks the last message received by each user. So if you plan to use "last", make sure that no one else is using your DDS account.

5.2 Network List File Format

Network List Files are ASCII text files that contain a series of DCP addresses, one per line. By convention, they should have a ".nl" extension.

The only mandatory restriction on the format of the file is that each line should begin with a hex DCP address (8 chars long). However, several utilities in the LRGS software suite can accept an enhanced format that allows you to associate names and comments with each DCP address:

```
Address:Name Comment
```

- The line should begin with the hex DCP address followed by a single colon.
- The first blank-delimited word following the colon is taken to be the DCP name.
- Any additional text following the name is a free-form comment.

For example:

```
CE123456:BLUE_RIV Blue river at west fork – stage, temp
```

- The DCP address is CE123456
- The DCP Name is “BLUE_RIV”. This name can be used for a variety of purposes within the LRGS.
- The comment is “Blue river at west fork – stage, temp”

6. The Command-Line Test Client Program

A very simple command-line client program is included in the distribution. The primary utility of this program is a test tool for situations where it is not practical to run the GUI.

The command line program is written in Java. Start it on an MS-DOS system by typing:

```
cd C:\LrgsClient
set CLASSPATH=./LrgsClient.jar
java lrgs.lddc.Client -h host -p port
```

On a Unix or Linux system, type:

```
cd install-dir
CLASSPATH=./LrgsClient.jar
export CLASSPATH
java lrgs.lddc.Client -h host -p port
```

… where

- *installdir* is the directory in which you installed the LRGS client distribution.
- *host* is a host-name, fully-qualified domain name, or IP address.
- *port* is the numeric port number (LRGS defaults to 17000).

The client is a simple command line program. Type a command and press ENTER. You will get a response back on the screen. The following commands are implemented:

help	Print a list of available commands.
quit	Exit the program.
hello *username*	Login to the server as a particular user. This must be a valid account on the LRGS.
bye	Logoff from the server.
msg	Get the next DCP message that passes the criteria I selected. If no criteria was selected, retrieval will start with the oldest message currently in storage.
putcrit *filename*	Send the named search-criteria file to the LRGS. The next time you issue the 'msg' command, only DCP messages that pass the selected criteria will be returned.
getcrit *filename*	Retrieve the current search-criteria from the LRGS and save it in the named file.
putnl *localname svrname*	Send the named network list file to the LRGS. 'localname' is the name of the file here. 'svrname' will be the name of the copy on the LRGS machine. See section 4 for a discussion on using network lists and search criteria.
getnl *svrname localname*	Retrieve the named network list file from the LRGS and save it here.